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The formation of a temporal perspective as an aspect of adaptation to disease and to treatment. Analysis based on studies of renal replacement therapy patients

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Summary

Aim. Time is an essential part of human reality. Taking into consideration the existence as a mechanism of regulation, it was attempted to explain connections between temporal perspective and some coefficients of psychological functioning of people with somatic disease. It was based on the hypothesis that participation in a therapy of incurable disease is a factor, which may cause some changes in the way of perception of the patients themselves and the world.

Method. 90 patients of The Clinic of Nephrology CMUJ and ŚLAM were examined. The following investigative techniques were used: Basic Hope Inventory (BHI-12), the Acceptance of Illness Scale, the Beck Depression Inventory (BDI) and the Questionnaire of Time Perception (eng. Zimbardo Time Perspective Inventory – ZTPI).

Results. The conducted analyses revealed a few correlations. They enabled to establish a model illustrating the influence of coefficients of adaptation to a disease and treatment on observing the time. According to the analyses both positive and negative references to the past are connected with the intensification of depressive symptoms. Moreover, the concentration on constructive experiences was regulated by the basic hope and tendency to act according to positive stimuli. The impact of the acceptance of a disease and negative past on the quality of present feelings was indicated. The domination of temporal orientation "for future" correlates with depression, the acceptance of a disease and the concentration on positive memories.

Conclusions. The constellation of coefficients of adaptation to a disease and treatment is an important factor which shapes the perception of time by people with chronic diseases.

Key words: temporal orientation, chronic treatment, coefficients of adaptation

Introduction

Many branches of science deal with the considerations on the complexity of the nature of time: physics, philosophy, biology and history, and also psychology. Until the early twentieth century people were convinced that the time is absolute size, does not depending on subject executing the measurement, provided that a proper clock is used.

It was Albert Einstein in his theory of relativity who introduced the "time paradox" - the assumption that each body has its own time, and so it is a relative size, or even illusion [1, 2, 3]. Yet differently the issue of relativity appears in the interpretation according to Heisenberg's uncertainty principle, the effect of which is the claim that time is not linear value, but changes abruptly. According to the laws of physics, the inability to accurately determine the time results from the very nature of reality [4].

Today, the psychophysics of human experiencing of time refers to the environmental and individuals factors, such as the overall situational context, beliefs, values, emotional tone, vitality, biological resources, etc. Within temporal psychology the rhythm of life changes and processes occurring in the human organism are considered - the biorhythms, circadian cyclicity and their neural bases [5]. In the case of patients with renal insufficiency this rhythm is determined by the specificity of renal replacement therapy: the dialysis treatment cyclically applied, regular use of medications, regular control visits, etc. Invasive procedures (dialysis) aimed at regulating biochemical metabolic processes in a continuous process of life, are not constantly performed (as it is with properly functioning kidneys), but once every 2-3 days, which dramatically changes the functioning of patients at biological level. The changes that result from the intermittent dialysis system provoke the need for a new homeostasis at both physiological and psychological levels. The mechanisms that guarantee rhythmical body functions trigger changes in the pattern of individual perception of time by a given person.

Modern psychology draws attention to 3 levels of experiencing time, i.e. temporal coding. It is done on the basis of relatively independent internal clocks, namely the neurobiological, psychological and existential ones [5, 6]. Each is responsible, at a different level, for sequences of human action as a chain of cause and effect relations - for the adequacy of circadian rhythms, automatic concentration of attention on the adaptive responses, for attitude and motivation. The effect of clocks is reflected in the situation of renal replacement therapy, and in the aspect of dealing by patients with fluidly-dietary regime seems to be particularly important. It can therefore be considered as a causative factor of the tendency to pro-and anti- healthy behaviors [7].

The impact of people on their own temporal clocks has not fully been investigated. The biggest role is found in the ability to influence on existential coding, because it is responsible for the development and possible change of time perspective reflecting the human attitude to the past, present and future, attitudes towards them as well as mutual relations occurring between them [8]. It is defined as a personal and often unconscious attitude towards time, and also as the process of extracting time categories which allow to give life the order, coherence and meaning [9]. Is a factor largely regulating human behavior. P. Zimbardo studies led to the description of five perspectives of time recognition [7, 10]. Each of them designates a different hierarchy of values, emotional attitude to oneself and other people, and tendency to use gratification and react with particular behavior to changing life situations. These are: positive past, negative past, hedonistic present, fatalistic present and future.

Concentration on what is yet to come, makes the thoughts and experiences focused on the expectations and perceptions concerning the future, not the currently active sti-

muli. Dominant present temporal perspective implies intensive experiencing of what is happening at the moment. Orientation to past means "living on memories", attachment to tradition. In the 90s of XX century, studies on people with somatic functioning taking into account their dominant temporal perspective have begun. The results showed that there are directly proportional relationships between the perception of time focused on the future and the activity of patients in making healthy behavior [7]. Regularities in this regard were also detected taking into account the dimensions of sense of satisfaction [11], the meaning of life [12] and the evaluation of own experiences [13].

The supposition that temporal perspective can play a significant role in the process of adaptation to disease and treatment was the inspiration for the development of research presented below. Especially interesting seems to be the problem of temporal change of perspective in the context of severe, incurable disease that requires profound adaptation changes. Incurable disease and the need for invasive treatment prolonging life is a highly stressful situation, connected with a threat to elementary values. Adapting to disease and treatment requires changes at many levels of functioning, beginning from biological level, where the unit time is determined by the circadian rhythm [5, 6]. In people whose lives changed radically under the influence of the disease, there is the phenomenon of limit of life perspective. The process of change taking place in the course of adaptation to chronic and terminal illness changes the perception and focus on specific intervals of time.

The aim of this study was to determine the cause and effect relationships between coefficients of adaptation to the disease and treatment and temporal dimensions. An attempt was made to determine the model illustrating the temporal perspective of the development of adaptation coefficients. It was decided to carry out an analysis by answering the following questions:

1. Does the character of adaptation affects the temporal perspective?
2. Does the attitude to life shaped by the basic hope mediates between permanent adjustment features a temporal perspective?
3. Which of the selected coefficients of adaptation are important for the particular perspectives of time?

Material and research methods

Before starting the research, the operationalization of the research problem was performed taking into account its various stages. The study was conducted among 90 patients of the Clinic Hospitals of CM UJ and SUM treated for end-stage renal failure, undergoing chronic renal replacement therapy. The decisive majority of respondents answered orally to the read by a psychologist positions of questionnaires during hemodialysis treatments, or in the waiting room during regular check-ups. The sample was created by a 30 persons hemo-dialyzed (HD), 30 peritoneal dialyzed (PD) and 30 with kidney transplanted (TR). People with different periods of renal replacement therapy were examined. The shortest duration of treatment was 1 month (1 person), the longest - 28 years. The average was about 6 years and 2 months, standard deviation - 5 years. Most people (8) remained in treatment for 5 years. To neutralize the distorting

effect of age on the final picture of the person's results, patients between 50 and 65 years of age were tested (mean age: 57.01, standard deviation: 4.898), including 35 women and 55 men. These were mostly not employed persons on pension (59 people, almost two thirds of all respondents) or retired (27 persons, of which 4 were working despite the pension). Only 7 people were still employed (4 HD, 2 TO, 1 TR).

1. In the study the Questionnaire of Time Perception was used, which is an polish adaptation of the aforementioned ZTPI (Zimbardo Time Perspective Inventory, Polish adaptation: M. Mażewski) [14]. It allows for measurement of characteristic for a man perspective of time (dependent variable), describing it not only because of the dominance of certain periods of time, but because of the emotional attitude to them. The questionnaire items include five subscales interval. Positive Past and Negative Past Future concern, respectively, the positive and negative aspects of orientation to the past. Hedonic Present and Fatalistic Present help to diagnose the orientation towards the current event. Present-oriented people tend to, in the decision-making situations as well as in the activities, rely on the direct and main aspects of the signals from the environment, giving them positive (hedonism) or negative (fatalism) value. The last scale of the questionnaire - Future - allows to determine targeting of thought and action for future events. The persons oriented in this way tends to base their decisions and actions according to their anticipated consequences [7, 9, 10, 13, 14].

2. Among the coefficients of adaptation a constant personality variable was distinguished - basic hope - which is defined as the belief that the world is ordered (meaningful) and supportive towards people [15, 16]. It is a part of the world view, so it is not identical with hope in the colloquial meaning. However, it determines its base, allowing for a constructive response of the individual to the situation of novelty or decay of the existing order of life. Its measurement is possible with the Basic Hope Inventory - BHI-12, developed by J. Trzebiński and M. Zięba [16].

3. Further applied research techniques related to the current mental adjustment of patients to the stress of illness. These were the Beck Depression Inventory (BDI) and the Acceptance of Illness Scale, AIS in the adaptation of Zygfryd Juczyński [17]. Beck Depression Inventory refers to the assessment of the classic symptoms of depression: behavioral, motivational emotional, cognitive, and vegetative. The Acceptance of Illness Scale Disease is a predictor of the patients' quality of life, understood as a feeling of satisfaction and subjective assessment of the current state of health. This variable is manifested in less severe negative reactions and emotions associated with the current disease [17].

Constellation of the described permanent and changeable coefficients shapes the character of adaptation to illness and treatment. Based on the literature, it can be assumed that people with high levels of basic hope and acceptance of the disease and without depressive symptoms will shape the future-oriented temporal perspective [7].

The obtained results were empirically subjected to statistical verification using the Shapiro-Wilk test. This was the initial stage of data analysis, in the result of which the compatibility of the obtained distributions for all variables with a normal distribution was confirmed. Then the empirical data were subjected to analysis of paths in the AMOS

program. Using exploratory paths analysis model, the likely model of relationships between variables was identified. Detailed analysis does not suggest introduction of any amendment, because the empirical data show the importance of the model and the individual paths to be treated comprehensively.

Results

Table 1 presents the statistical characteristics of the variables in the studied group. It contains the means and standard deviations for the whole group and sub-groups - of persons receiving renal replacement therapy by three methods. Since in statistical analysis conducted with the technique of univariate analysis of variance ANOVA it was indicated that the type of the applied therapy did not significantly differentiate investigated variables [18], so it was decided to further examine comprehensively the results of all 90 people, not dividing them into subgroups due to the treatment technique.

Table 1. **Characteristics of the research groups in the range of coefficients of adaptation and temporal orientation**

	N	Basic hope	Acceptation of illness	Depressive symptoms	Positive Past	Negative Past	Present Hedonism	Present Fatalism	Future
All participants	90	x = 25,71 SD = 3,50	X = 22,26 SD = 7,71	x = 14,18 SD = 8,24	x = 3,70 SD = 0,52	x = 3,18 SD = 0,70	x = 3,34 SD = 0,48	x = 3,49 SD = 0,69	x = 3,54 SD = 0,53
Hemodialyzed	30	x = 25,77 SD=3,48	x = 23,77 SD = 8,03	x = 14,07 SD = 9,07	x = 3,66 SD = 0,47	x = 3,15 SD = 0,69	x = 3,23 SD = 0,55	x = 3,34 SD = 0,66	x = 3,40 SD = 0,46
peritoneal dialyzed	30	x = 24,90 SD = 3,487	x = 21,40 SD = 7,57	x = 14,93 SD = 8,20	x = 3,73 SD = 0,52	x = 3,06 SD = 0,75	x = 3,34 SD = 0,40	x = 3,47 SD = 0,69	x = 3,64 SD = 0,50
with kidney transplant	30	x = 26,47 SD = 3,48	x = 21,60 SD = 7,56	x = 13,53 SD = 7,61	x = 3,72 SD = 0,58	x = 3,33 SD = 0,65	x = 3,46 SD=0,47	x = 3,65 SD = 0,73	x = 3,60 SD = 0,61

x – arithmetic mean SD – standard deviation

While fulfilling the research goal, structural model (Fig. 1 *next page*), showing the paths of determination between primary hope, current well-being and temporal perspective was established. Statistical coefficients of the paths determination indicate a high significance of the obtained correlations (Fig. 2 *next page*).

These indicates that the aggravation of symptoms of depression affects the way of referring to the past in such a way that it activates the negative patterns of interpreting past events ($p < 0.01$), and the positive ones are inhibited ($p < 0.05$). Evaluation of the past in favorable, warm and full of nostalgia way is shaped by hedonistic orientation to the present ($p < 0.05$) and a high conviction of the order and supportiveness of the world ($p < 0.05$).

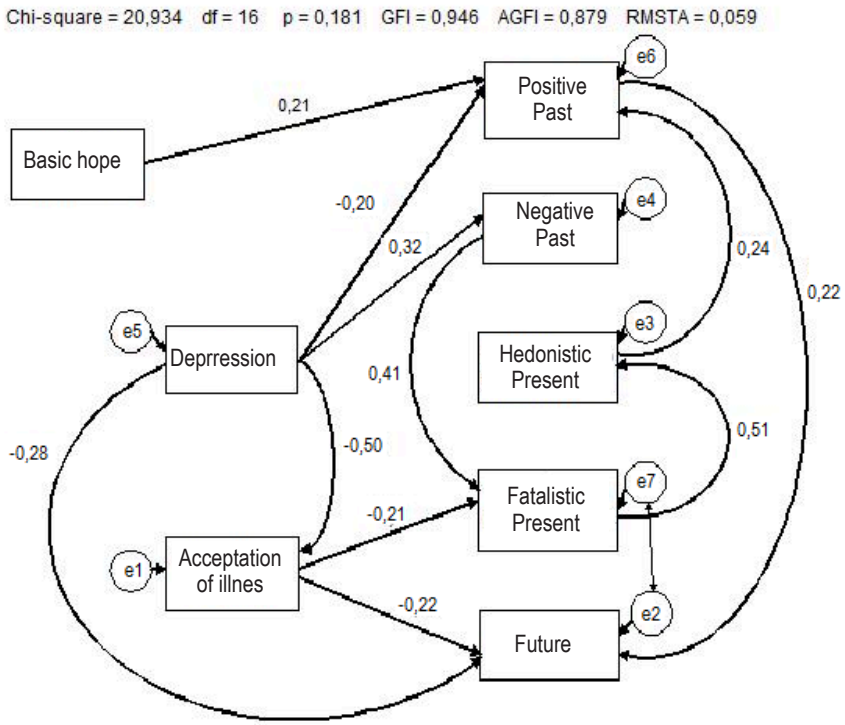

Figure 1. **Model illustrating the path of causality between variables (exploratory path analysis results)**

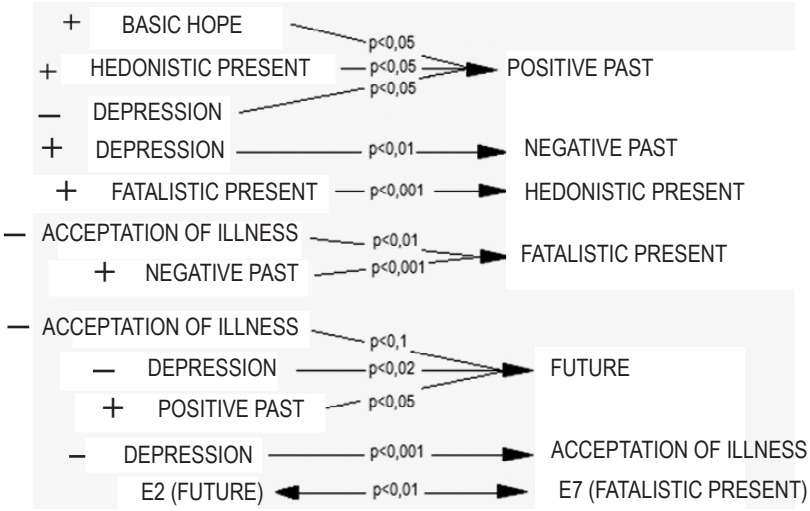

Figure 2. **Levels of significance of individual paths**

Patients focused on the negative aspects of past experiences achieve high coefficients of fatalistic experiencing of the present. Such a critical attitude to the "here and now" reduces the acceptance of their illness. However, a sense of helplessness towards the acting stimuli and conviction about the lack of impact on one's own lives increases the occurrence of behaviors provoked by the need to seek pleasure and avoid pain ($p<0.001$).

Constructive evaluation of past experiences enhances the orientation to the future ($p <0.05$). The aggravation of symptoms of depression ($p <0.02$) and greater acceptance of the disease ($p <0.1$) has negative impact on future-oriented temporal perspective, but between these two variables correlation is inversely proportional ($p <0.001$).

The results also indicate the existence of a negative correlation ($p <0.01$) between residual variables of future orientation (e2), and fatalistic present (e7).

Discussion of results

It was decided to begin the discussion of the obtained results from the answer to the first research question, which concerned the issue: "Does the nature of adaptation affects the temporal perspective? "The character of the adaptation was determined by constellation of permanent and changeable adaptation coefficients. The results of the analyzes indicate the existence of a relationship between the coefficients of adaptation to the disease and the treatment and the perception of time. This made it possible to develop a model that illustrates the development of the temporal perspective by predictors of adaptation.

It was expected that the results will show the correlations between permanent feature, for which a fundamental hope is considered and changeable coefficients of current mental adjustment of patients to the stress of illness (acceptance of illness and depression) [15, 16]. However, the achieved causality model contains no links between these factors. Such independence between distinguished adaptation coefficients may be explained by indicating the numerous burdens resulting from disease and treatment, which becomes a part of the patients functioning. Appearing in patients symptoms of depression are of reactive nature because they are more related to physical exhaustion in the process of struggling with health problems than with the personality conditioned depressiveness. These results also seem to confirm the supposition of J. Trzebiński J. and M. Zięba [15, 16] that the adaptive character of the basic hope is reflected mainly in new situations, when as a result of external events the existing order of life is breaking down. Patients who have already had many years of struggle with kidney disease, and for a long time have remained in renal replacement therapy probably already reached a new homeostasis, and an image of their disease has been built into the order of the world.

The developed model showed that patients with high severity of depressive symptoms were strongly focused on the unpleasant experiences of the past and had a weak tendency to positive interpretation of past events. On the way in which patients relate to their past influences both the current general state and the characteristics shaped by experience. Depressed mood conduce to referring to the negative experiences of the

past, and also makes the past events less likely to be recollected positively. These results are in line with the principle of compatibility by G. Bower [19] and observations of P. H. Blaney [19], according to which mood activates compatible with it materials in the memory - various memories are more easily reminded in adequate to them emotional states. The impact of current experiences on to the way of referring to the past, creates a chance to change the way in which past events continue to affect the further lives of the ill people by the formation of temporal orientation. This relationship should be taken into account in the treatment of patients. Assistance in a positive reassessment, re-organizing of memories, the introduction of hierarchizing techniques can change the structure of the picture of reality in the desired direction. Additionally, the interpersonal context in which difficult experiences are invoked - climate of therapeutic relationship, emotional experiencing of contact based on trust and empathy - gives the ability to tolerate increased levels of arousal. L. Cozolino (2002) claims that formatting new patterns of emotional response in the process of treatment is accompanied by neural network expansion and activation of alternative paths. This results in an increased inhibition of the structures associated with negative emotions (e.g., amygdala) by integrating arousal with other specific areas of the brain (e.g., frontal cortex) [20]. A relatively permanent character of the desired changes in the present experiencing of the world raises belief in its ordering and supportiveness and favors referring to one's own past in a warm and supportive manner.

Although lack of direct connection between basic hope and depression surprises in the model, yet both factors have the power to shape the positive orientation of the past. Warm and full of nostalgia assessment of the past is bound to focus on the future.

On the attitude to that what was, also influences the hedonism of present. It concerns persons concentrating on their positive experiences and searching for further pleasure. Their hedonism is associated with impulsivity and relative easiness in risk-taking, which may manifest itself in the tendency to react calmly to potentially threatening situations, interpreting the events as safe by definition. This result seems to be consistent with the results of research on the nature of adaptation to chronic dialysis [21]. Some of the of patients studied were characterized by a high level of emotional adaptation and the predominance of positive over negative emotions, accompanied by disregard for medical recommendations. This way of adaptation was a characteristic for people with high confidence in their own and other people's resources, conditioning resistance to difficult situations. It was seen in the persons for whom the superior value seems to be not so much their own health, but rather the joy of life [22]. It can be assumed that the pursuit of pleasure and relying in the behaviors on the currently active stimuli also results from the need to protect the joy of life against the disease. This results in reconstructing past experiences as positive, creating a certificate of trust to the available resources.

The model also reveals the effect of the second variable adaptation coefficient. Acceptance of disease reduces fatalism, and concentration on negative experiences conduce to fatalistic present, which in turn enhances the results obtained in the scale of hedonism. According to the assumptions of the factor, acceptance of limitations associated with the disease and treatment reduces the sense of helplessness and ho-

pelessness [14]. Decreases the excessive focus on the symptoms, helps to maintain a sense of satisfaction and responsibility for own life. On the other hand, fatalism in experiencing the present increases the feeling of helplessness in the face of current and future events. Ruminations of negative experiences intensify the feeling of resignation and conviction of the lack of impact on one's own life. Paradoxically, they may increase the hedonistic attitude to the "here and now". Trying to explain the result there is a need to go back to its interpretation in terms of the specificity of terminal illness. It is very likely that, given the poor prognosis of chronic renal failure, helplessness in the face of present and future events may induce orientation to present satisfaction. This can happen even at the cost of not taking into account the possible consequences of own actions. It is likely that in some patients a sense of helplessness and conviction about lack of the impact on their own lives intensifies the tendency to be directed by current pleasures in activities. Patients overwhelmed by a high sense of helplessness, convinced of the lack of influence on their own lives and health, withdraw some of the energy from the objectives of health, to invest it in other. They can thus protect the values and resources more important or more accessible in the current situation. According to Zimbardo, in the exceptionally difficult conditions fatalism may have a realistic character. This would mean that in such a scheme can function even those with rich resources. These findings are consistent with the results of research on adaptation to chronic dialysis [21]. Emotional pattern of adaptation was characterized in them, (EWA – eng. EPA) used by approximately 35% of the patients studied. These were the people whose positive emotions (contentment, joy) strongly dominated over the negative (sadness, aggression or anxiety). Despite the relatively high knowledge about the adequate to the disease behaviors and care for physical condition, they did not comply with the fluid, diet and pharmacological regime, EWA (EPA) has been used by individuals with resources such as temperamentally determined resistance to stressful situations, a high sense of coherence and relatively high knowledge of adequate to disease behaviors. Thus, in people aware of their capabilities and being able to use them.

The model includes inversely proportional relationship between the severity of depressive symptoms and the acceptance of the illness. Both depression and lack of acceptance are associated with a high sense of discomfort and severity of negative reactions. Depressed mood increases experiencing the disease as unacceptable, and results in the loss of irreplaceable values. Depression intensifies criticism in evaluating the effectiveness of own abilities to cope with the requirements of treatment and enhances experiencing the disease as a disability.

To low interest in the future leads both depression and acceptance of the disease. Some patients are characterized by high coefficients of both of these variables. These are people treating their illness in a depressive manner: with resignation and hopelessness accept their illness as impossible to avoid. Their poor future orientation was manifested in lack of tendency to regulate behavior basing on the anticipated consequences of own actions. They were not interested in pursuit of future rewards and achieving set goals in the future.

Persons positively interpreting the past, are able to reconstruct past experiences as a valuable, are characterized by trust to each other and to the world, and therefore can create the future, be guided by anticipated consequences of their own actions, strive for future gratification.

Summing up the discussion of the model, the following answers to the research questions can be formulated:

1. The character of adaptation to the illness and treatment determined by constellation of permanent and changeable psychological factors affects the temporal perspective, although the obtained correlations were not as expected.
2. In the developed statistical model acceptance of illness and depression are the factors shaping temporal perspective in a way that is independent from the basic hope.
3 All the analyzed coefficients of adaptation are in a significant way correlated with temporal perspective, and are part of an empirical model depicting paths of causality.

Although the used Questionnaire of Time Perception seems to have satisfactory psychometric properties [14], the presented model revealed correlation between the residual variables of the present fatalism and future. This result can be explained by the specificity of the studied population. It is possible that end-stage renal failure and replacement therapy has an impact on the way of interpreting questions relating to the future and fatalistic present, and contributes to the covariance of residual variances. In the general interpretation of the results it should be kept in mind.

At the end of the above considerations it is worth noting that depicted in the model correlations seem to have more general nature. The studied group was numerous, and the obtained correlations are statistically important, which allows to look in them for explanations for adaptive behavior in patients treated chronically because of somatic diseases. The above assumptions undoubtedly require further empirical considerations.

Conclusions

1. Constellation of coefficients of adaptation to illness and treatment is an important factor shaping the perception of time by persons subjected to renal replacement therapy.
2. Basic hope, acceptance of the disease and the symptoms of depression are important elements of the model depicting cause and effect relationship between adaptation and the perception of time.
3. In the developed model variables associated with the current emotional functioning of patients affect the perception of time, regardless of the basic hope. There is no reason to assume that the acceptance of illness and depression mediate between the basic hope and temporal perspective.
4. Patients experiencing their situation in a depressive way, even if they accept it, focus on the aversive experience of the past, ignoring the constructive ones.

5. Participants s not accepting their illness, and at the same time experiencing their own past as painful and aversive, achieve high scores on a scale of fatalism. On the other hand, experiencing the present as hopeless, with a sense of helplessness and lack of impact on their own lives, are more apt to be directed by current pleasures
6. Patients who talk positively about their past, have a deep belief in the meaningful order and supportiveness of the world, hedonically experience present and can create visions for the future.
7. The indicated correlations enabled to show the multifaceted picture of adjustment as well as allowed for assistance in adequate selection of directions of psychological proceedings with patients chronically treated due to incurable somatic disease.

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